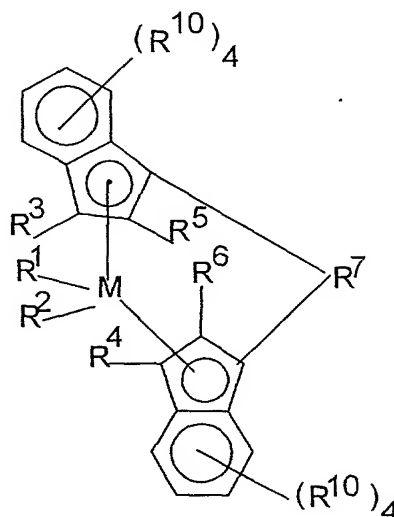


METALLOCENE COMPOSITIONSABSTRACT

This invention relates to metallocene compositions and their use in the preparation of catalyst systems for olefin polymerization, particularly propylene polymerization.

In one embodiment, the metallocenes of the present invention may be represented by the formula:



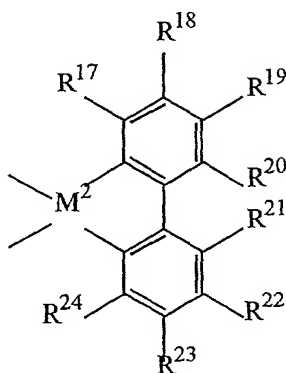
wherein: M is a metal of Group 4, 5, or 6 of the Periodic Table preferably, zirconium, hafnium and titanium, most preferably zirconium;

R¹ and R² are identical or different, preferably identical, and are one of a hydrogen atom, a C₁-C₁₀ alkyl group, preferably a C₁-C₃ alkyl group, a C₁-C₁₀ alkoxy group, preferably a C₁-C₃ alkoxy group, a C₆-C₁₀ aryl group, preferably a C₆-C₈ aryl group, a C₆-C₁₀ aryloxy group, preferably a C₆-C₈ aryloxy group, a C₂-C₁₀ alkenyl group, preferably a C₂-C₄ alkenyl group, a C₇-C₄₀ arylalkyl group, preferably a C₇-C₁₀ arylalkyl group, a C₇-C₄₀ alkylaryl group, preferably

a C₇-C₁₂ alkylaryl group, a C₈-C₄₀ arylalkenyl group, preferably a C₈-C₁₂ arylalkenyl group, or a halogen atom, preferably chlorine, or are a conjugated diene which is optionally substituted with one or more hydrocarbyl, tri(hydrocarbyl)silyl groups or hydrocarbyl, tri(hydrocarbyl)silylhydrocarbyl groups, said diene having up to 30 atoms not counting hydrogen;

R⁵ and R⁶ are identical or different, preferably identical, are one of a hydrogen atom, a halogen atom, preferably a fluorine, chlorine or bromine atom, a C₁-C₁₀ alkyl group, preferably a C₁-C₄ alkyl group, which may be halogenated, a C₆-C₁₀ aryl group, which may be halogenated, preferably a C₆-C₈ aryl group, a C₂-C₁₀ alkenyl group, preferably a C₂-C₄ alkenyl group, a C₇-C₄₀ -arylalkyl group, preferably a C₇-C₁₀ arylalkyl group, a C₇-C₄₀ alkylaryl group, preferably a C₇-C₁₂ alkylaryl group, a C₈-C₄₀ arylalkenyl group, preferably a C₈-C₁₂ arylalkenyl group, a -NR₂¹⁵, -SR¹⁵, -OR¹⁵, -OSiR₃¹⁵ or -PR₂¹⁵ radical, wherein: R¹⁵ is one of a halogen atom, preferably a chlorine atom, a C₁-C₁₀ alkyl group, preferably a C₁-C₃ alkyl group, or a C₆-C₁₀ aryl group, preferably a C₆-C₉ aryl group;

R⁷ is



wherein:

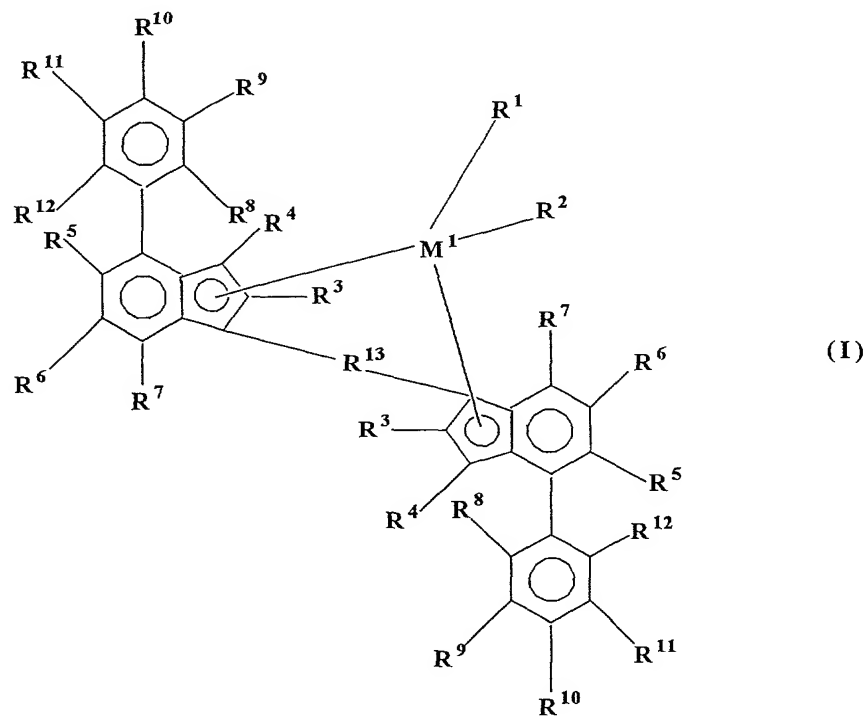
R^{17} to R^{24} are as defined for R^1 and R^2 , or two or more adjacent radicals R^{17} to R^{24} , including R^{20} and R^{21} , together with the atoms connecting them form one or more rings;

M^2 is carbon, silicon, germanium or tin;

the radicals R^3 , R^4 , and R^{10} are identical or different and have the meanings stated for R^5 and R^6 . Two adjacent R^{10} radicals can be joined together to form a ring system, preferably a ring system containing from about 4-6 carbon atoms.

Alkyl refers to straight or branched chain substituents. Halogen (halogenated) refers to fluorine, chlorine, bromine or iodine atoms, preferably fluorine or chlorine.

The metallocene compositions may also be represented by the formula:



wherein: M^1 is selected from the group consisting of titanium, zirconium, hafnium, vanadium, niobium, tantalum, chromium, molybdenum and tungsten, preferably zirconium, hafnium or titanium, most preferably zirconium;

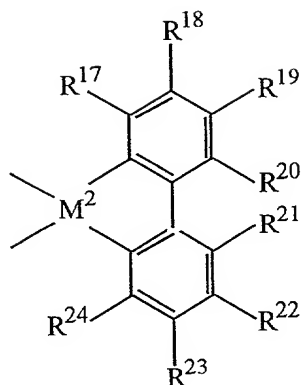
R^1 and R^2 are identical or different, and are one of a hydrogen atom, a C_1 - C_{10} alkyl group, a C_1 - C_{10} alkoxy group, a C_6 - C_{10} aryl group, a C_6 - C_{10} aryloxy group, a C_2 - C_{10} alkenyl group, a C_2 - C_{40} alkenyl group, a C_7 - C_{40} arylalkyl group, a C_7 - C_{40} alkylaryl group, a C_8 - C_{40} arylalkenyl group, an OH group or a halogen atom, or are a conjugated diene which is optionally substituted with one or more hydrocarbyl, tri(hydrocarbyl)silyl groups or hydrocarbyl, tri(hydrocarbyl)silylhydrocarbyl groups, said diene having up to 30 atoms not counting hydrogen;

preferably R^1 and R^2 are identical and are a C_1 - C_3 alkyl or alkoxy group, a C_6 - C_8 aryl or aryloxy group, a C_2 - C_4 alkenyl group, a C_7 - C_{10} arylalkyl group, a C_7 - C_{12} alkylaryl group, or a halogen atom, preferably chlorine;

R^3 are identical or different and are each a hydrogen atom, a halogen atom, a C_1 - C_{10} alkyl group which may be halogenated, a C_6 - C_{10} aryl group which may be halogenated, a C_2 - C_{10} alkenyl group, a C_7 - C_{40} arylalkyl group, a C_7 - C_{40} alkylaryl group, a C_8 - C_{40} arylalkenyl group, a $-NR'^2$, $-SR'$, $-OR'$, $-OSiR'_3$ or $-PR'_2$ radical, wherein: R' is one of a halogen atom, a C_1 - C_{10} alkyl group, or a C_6 - C_{10} aryl group; preferably R^3 is not a hydrogen atom;

preferably each R^3 is identical and is a fluorine, chlorine or bromine, atom, a C_1 - C_4 alkyl group which may be halogenated, a C_6 - C_8 aryl group which may be halogenated, a $-NR'^2$, $-SR'$, $-OR'$, $-OSiR'_3$ or $-PR'_2$ radical, wherein: R' is one of a chlorine atom, a C_1 - C_4 alkyl group, or a C_6 - C_8 aryl group;

R^{13} is represented by the formula:



wherein: R^{17} to R^{24} are as defined for R^1 and R^2 , or two or more adjacent radicals R^{17} to R^{24} , including R^{20} and R^{21} , together with the atoms connecting them form one or more rings; preferably, R^{17} to R^{24} are hydrogen.

M^2 is carbon, silicon, germanium or tin, preferably silicon;

R^8 , R^9 , R^{10} , R^{11} and R^{12} are identical or different and have the meanings stated for R^4 to R^7 .

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